Ψ-FM-30×100 Tactical Field Cell

Carlos Omeñaca Prado

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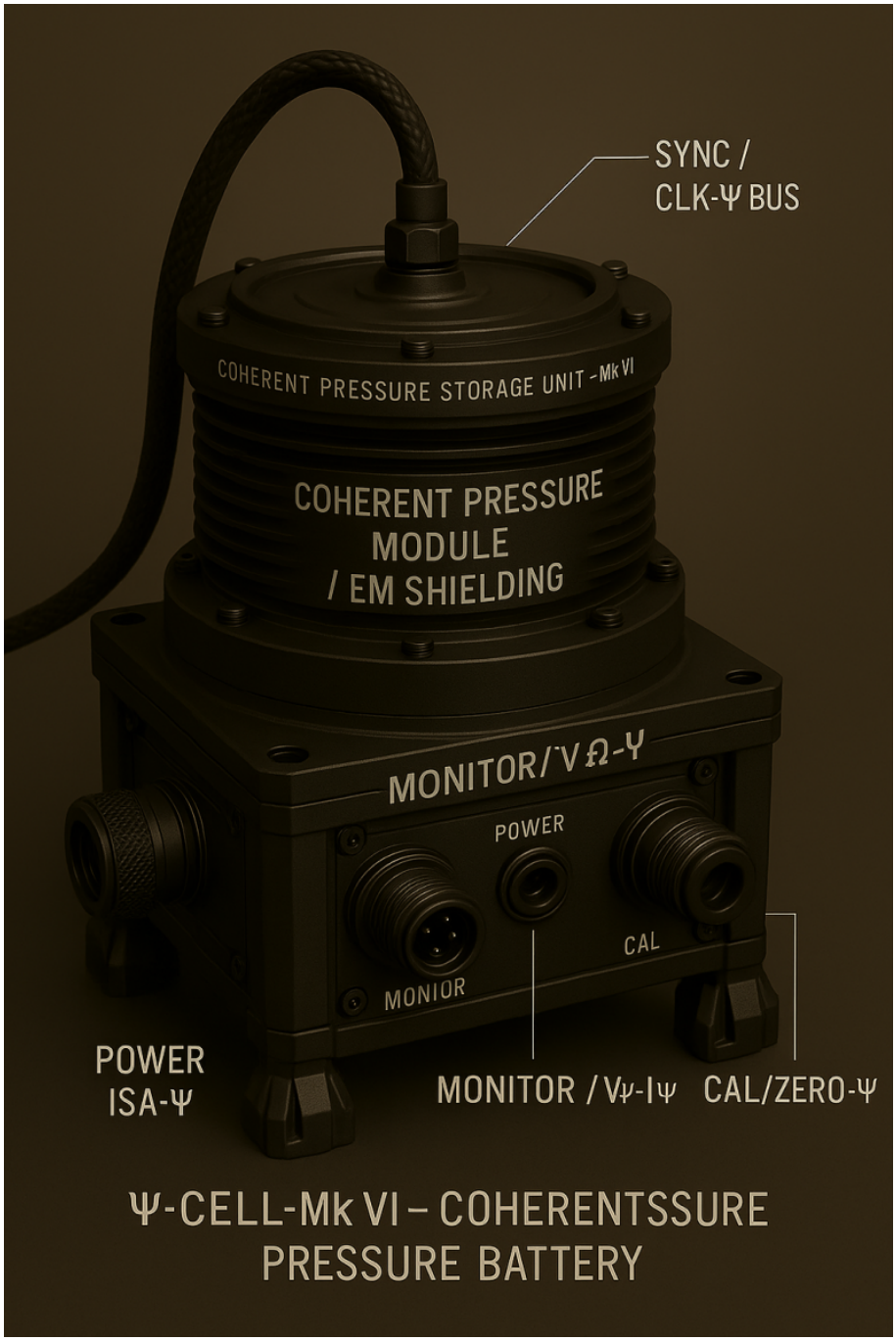

Figure 1: Ψ-FM-30×100 Tactical Field Cell

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1 General format

A **solid rectangular block**,

- **Cubic base** with 4 reinforced legs.
- **Exposed military-grade bolts** (8 to 12 M5/M6 bolts).
- Full matte finish in **black anodized aluminum** or **technical polymer**.

Technical rationale: The document requires mechanically stable containment, low thermal drift, and protection against humidity (<10% RH).

2 Upper module (active Ψ-Cell core)

- Approximate diameter: **60–80 mm**.
- Height: **35–55 mm** (depending on 500 or 1000 layers).
- **Cooling fins** or concentric rings, same as the Coil, because:

  The technical memory indicates that ΔT must remain below 5 °C even at maximum power.

Internally: 60×60 mm or 100×100 mm active area (depending on prototype), isochronous compression of the stack, and alignment guide pins.

3 Integrated electronics

Located in the lower block:

- **Synchronous-rectification MOSFET bridge** (the four required N-channel MOSFETs).
- **Boost inductor (47–100 μH)**.
- **Telemetry**: V_Ψ, I_Ψ, V_{DC}, I_{DC}, Q, τ, phase, temperature at 5 points (section 7.12).
- **MCU / digital PLL and MPPT-Ψ** (STM32G4 or C2000).

4 Connectors

Three front-facing connectors, horizontally aligned:

1. **POWER / ISA-Ψ (7-pin)**
   - +12 V regulated

- Return
- SIG-OK
- SIG-ERR
- CLK-Ψ
- SYNC-0
- Analog telemetry

2. **B-FIELD / V_Ψ–I_Ψ MONITOR**
   - Port to record V_Ψ and input current before the rectifier (diagnostics).
   - BNC or LEMO.
3. **CAL / ZERO-Ψ**
   - For phase alignment, offset tuning, and calibration of $k_p \to V$ using an external bench.
   - Explicitly described in sections 3.5 and 19 of the technical document.

5 Physical labeling

- On the cylinder: **COHERENT PRESSURE MODULE / EM SHIELDING**
- On the front panel:
  - **POWER / ISA-Ψ**
  - **MONITOR / V_Ψ-I_Ψ**
  - **CAL / ZERO-Ψ**
- On the lower edge: **Ψ-CELL-Mk VI – COHERENT PRESSURE BATTERY**

On the top lid of the cylinder:

- Laser-engraved ring: **COHERENT PRESSURE STORAGE UNIT – Mk VI**

6 Upper cable

As in the Ψ-Coil, a **single heavy shielded cable**, exiting from the center of the cylinder:

- Labeled: **SYNC / CLK-Ψ BUS**
- Used to link multiple Ψ-Cells in parallel (power arrays)

7 Expected physical behavior

- Temperature increase must not exceed $\mathbf{+5\,^{\circ}C}$ over 60 s of operation at 1–5 W (section 6.7).
- No swelling, deformation, or electrolyte (zero chemistry).
- Must appear **fully solid and hermetically sealed**.
- A compact military-grade hardware, with no moving parts.

References

[1] Omeñaca Prado, Carlos (2025). *Batería Cuárquica de Presión Coherente (Ψ-Cell)*. Internet Archive.

Available at: https://archive.org/details/psi-coil-the-cylindrical-converter-of-coherent-pressure-complete-physical-functi